

CLAIMS

What is claimed is:

1. A method of creating a horizontal tip feature in a layer of tip material,
comprising:
5 using an etch process to create an etch feature in the layer of tip material, the
etch feature having a substantially vertical sidewall, and the etch process having a
slower etch rate near the sidewall; and
stopping the etch process in order to form a portion of the substantially
vertical sidewall and a horizontal tip feature adjacent to the portion of the sidewall.
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2. A method according to claim 1, further comprising:
monitoring the progress of the etch process.
3. A method according to claim 1, further comprising:
15 depositing the layer of tip material on a substrate material, the substrate
material being different than the tip material.
4. A method according to claim 3, further comprising:
selecting an etch process that is selective to the tip material relative to the
20 substrate material.
5. A method according to claim 1, further comprising:
varying a rate of polymer generation in order to control the slower etch rate of
the etch process.
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6. A method according to claim 1, further comprising:
determining the size of the horizontal tip feature to be created before using the
etch process.
- 30 7. A method according to claim 1, further comprising:
controlling the profile of the substantially vertical sidewall.

8. A method according to claim 1, further comprising:
filling the etch feature with a lens material in order to form a lens having a
shape determined by the shape of the etch feature.

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9. A method according to claim 1, further comprising:
positioning a photo-sensitive device adjacent the layer of tip material such that
the horizontal tip feature serves as an aperture for the photosensitive device.

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10. A method according to claim 1, further comprising:
placing a photoresist mask over the layer of tip material, the photoresist mask
acting as a mask for the etch process.

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11. A method according to claim 10, wherein:
stopping the etch process causes the etch feature to have a critical dimension
due to the horizontal tip feature that is less than the minimum dimension of the
photoresist mask.

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12. A method according to claim 1, wherein:
using an etch process includes using a reactive ion etch process.

13. An apparatus for decreasing minimum feature size in circuit design,
comprising:

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a substrate of a first material;
a layer of a second material adjacent the substrate; and
an etch feature in the layer of a second material, the etch feature having
sidewalls substantially perpendicular to the substrate and a sharp tip feature adjacent
the sidewalls and substrate, such that the dimension of a mask feature defined by the
sharp tip feature is smaller than the minimum dimension of the photolithographic
process used to create the etch feature.

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14. An apparatus according to claim 13, further comprising:
a layer of photoresist material over the layer of a second material.

15. An apparatus according to claim 14, further comprising:
a photolithography device for transferring a circuit pattern to the layer of
photoresist material, the circuit pattern containing a design feature corresponding to
the etch feature.

16. An apparatus according to claim 13, further comprising:
an etch reactor for etching the layer of a second material.

17. A micro-aperture for a photosensitive device, comprising:
a substrate of a first material capable of containing a photosensitive device;
a layer of a second material adjacent the substrate; and
an opening in the layer of a second material, the opening having sidewalls
substantially perpendicular to the substrate and a sharp tip feature adjacent the
sidewalls, such that the sharp tip feature forms an aperture for any photosensitive
device contained in the substrate.

18. A micro-aperture according to claim 17, further comprising:
a photosensitive device contained by the substrate.

19. A micro-aperture according to claim 17, wherein:
said opening in the layer of a second material is substantially circular.

20. A micro-aperture according to claim 17, further comprising:
a masking layer on the layer of a second material for controlling the shape and
dimension of the opening.